Remarks and Responses

Claims 1,2,4,5,8-14 have been amended, and Claims 3,6,7 have been cancelled without prejudice, claims 15-17 are newly added. As a result, Claims 1,2,4,5,8-17 remain pending the present application. Support for the amendments is found in the specification and drawings as filed. Accordingly, the amendments do not constitute the addition of new matter. Reconsideration of the application in view of the foregoing amendments and following comments is respectfully requested.

The specific changes to the amended specification and claims are shown on a separate set of pages attached hereto and entitled **VERSION WITH MARKINGS TO SHOW CHANGES**, which follows the signature page of this Amendment.

Drawing Objection

With respect to Paragraphs 1-2, the Examiner objected to the drawings under 37 CFR section 1.83(a) because they fail to show every feature of the invention specified in the claims.

The specification is amended to overcome the rejection item 1 and 2 on page 2 of Office Action. Applicant respectfully submits that the Examiner's objection is now overcome.

Claim Rejection - 35 U.S.C. 112, Second Paragraph

With respect to Paragraphs 3 and 4 of the Office Action, the Examiner rejected Claims 1-6, and 8-14 under 35 U.S.C. 112 as being indefinite. Specially, the Examiner stated that these claims are rejected for failing to particularly point out and distinctly claim the subject matter.

Applicants respectfully traverse this rejection.

Applicants agree with the opinion of the Examiner that the trademark/trade name should not be used in a claim as a limitation to identify or describe a particular material or product. The specification of this application discloses a stabilization plate made of heat-resistant PORON, is added on the surrounding of the thermal pad. The thermal pad make the heatsink well stick on the die, thereby efficiently dissipating the heat from the die, please see page 3, lines 9-16, therefore, the limitation of "PORON slice" in claims 1 and 5 is

amended by the limitation of "stabilization plate". The claims will comply with the requirements of 35 U.S.C. 112, second paragraph.

The limitations "the heatsink", "the thermal pad", "the chip" in claim 1; "the die" in claim 3; "the fingerprint" in claim 4; "the heatsink" in claims 6 and 8; "the thermal pad", "the heatsink", "the die" in claim 9; "the die" in claim 10; "the fingerprint" in claim 11 and "the bars" in claim 13 are all disclosed in the specification and all limitations are introduced in the claim by -an indefinite article "a" or "an". There is no insufficient antecedent basis for limitations described above.

Applicant respectfully submits that no new matter has been added by this change and further submits that the Examiner's rejection under Section 112 is overcome.

Reconsideration and withdrawal of this rejection is respectfully requested.

Claim Rejection - 35 U.S.C. § 103(a)

With respect to Paragraph 5 of the Office Action, the Examiner rejected Claims 1,2,4,5,6,8,9,11 under 35 U.S.C. § 103 (a) as being unpatentable over Bernier et al U.S. Patent No. 5,847,929 in view of Nidiffer U.S. Patent No. 4,197,586. Of the rejected claims, Claims 1 and 5 are independent.

Applicants respectfully traverse this rejection.

This application discloses a heatsink assembly having stabilization plate. The stabilization plate, such as an n-shaped PORON slice, is disposed under a heatsink, and is surrounding a thermal pad under the heatsink. By the stabilization of the stabilization plate, the heatsink is stably fastened on the die. If the stabilization plate has a thickness approximately equal to or larger than that of the die, Note that a fastening force from the clip should be considered, the stabilization plate will be too thick to provide a stable contact of the thermal pad onto the die. Therefore, **the preferable thickness of the stabilization Plate is smaller than that of the die.**

Bernier discloses a heat sink is attached to a ceramic cap or exposed semiconductor chip using an adhesive of silicone or flexible-epoxy adhesive. The thickness of all the adhesives disclosed by Bernier is larger than the thickness of the die. Bernier also fails to teach a heat sink having asymmetry fins. Nidiffer only discloses a PORON 64 between flexible printed board 38

and a rigid backing plate 66. Since Bernier and Nidiffer fail to teach, suggest, or otherwise render obvious the same features, the less thickness of the adhesive and a heat sink having asymmetry fins, as the present invention, one can only come to a conclusion that the claimed invention proposes a heatsink assembly having stabilization plate can not be obtained by combining the two inventions of Bernier and Niduffer.

Accordingly, Applicant respectfully submits that independent Claims 1 and 5 as amended are allowable over the art of record and respectfully requests the 35 U.S.C. § 103 (a) rejection of Claims 1 and 5 to be reconsidered and withdrawn. In addition, insofar claims 2,4,6,8,9,11 depend from independent Claims 1 and 5 and add further limitations thereto, the 35 U.S.C. § 103 (a) rejection of these claims should be withdrawn as well.

Reconsideration and withdrawal of this rejection is respectfully requested.

For the newly added claim 17

Applicant discloses that the thermal pad and the stabilization plate are simultaneously stuck to the bottom of the heatsink and the stabilization plate is set around the thermal pad (FIG. 3). The stabilization plate and the thermal pad are both positioned between the heatsink and the chip (FIG. 3). That is, the thermal pad and the stabilization plate are on the same level, which neither the Bernier nor the Nidiffer discloses it.

The Bernier does not disclose the above feature because that the Bernier can not find the problem that is clearly described on page 5, lines 9-18 of the present specification.

The Nidiffer discloses an electric calculator assembly that PORON 64 between flexible printed board 38 and a rigid backing plate 66. (See Fig. 3) The examiner considers it would have been obvious to use PORON in Bernier's invention to improve the contact between the chip and thermal pad. However, applicant's thermal pad and the stabilization plate are on the same layer, while Nidiffer's rigid backing plate 66 and the PORON 64 are different layers, not on the same layer. Nidiffer does not mention the torque generated between the chip and thermal pad. Nidiffer further does not mention the torque generated from the reason that the right portion of the heatsink is heavier than the left portion of the heatsink. Applicant's stabilization plate is used to overcome the torque generated between the chip and the thermal pad.

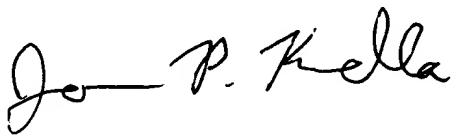
Accordingly, since both the Bernier and the Nidiffer do not teach the problem that is mentioned on page 5, lines 9-18 of the present specification. Bernier's structure has no motion to combine Nidiffer's PORON layer. Therefore, the claim 17 can be distinguish over the cited references.

Applicant respectfully submits that all claims in the present application are now in condition for allowance. Early and favorable indication of allowance is courteously solicited.

Conclusions

For all of the above reasons, applicants submit that the specification and claims are now in proper form, and that the claims define patatentably over the prior art. Therefore applicants respectfully request the Examiner to pass the case to issue at the earliest convenience.

Respectfully submitted,
OPPENHEIMER WOLFF & DONNELLY, LLP



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APPENDIX A – VERSION WITH MARKINGS TO SHOW CHANGES (SPECIFICATION)

VERSION WITH MARKINGS TO SHOW CHANGES (SPECIFICATION)

Please replace the paragraph beginning at page 5, line 1 with the following entry:

FIG. 2 is a schematic and three-dimensional view of a heatsink stabilization plate according to a preferred embodiment of the present invention. In general, solid molecules could not completely fill all vacant space between objects such as heatsink 204 and a die. The unfilled vacant space, therefore, needs to be filled with a thermal pad 202. Preferably, the thermal pad 202 is disposed on the contact between the bottom of the heatsink 204 and the die. In this way the thermal pad 202 serves as a medium for heat conduction. Through such a medium, heat is transferred in a surface-to-surface mode instead of a point-to-point mode. To closely stick the thermal pad 202 on the die, a clip (not shown) is added to fasten the die onto a socket thereunder. However, note that the right portion of the heatsink 204 has cooling fins ~~204a~~ 204b more than the cooling fins ~~204b~~ 204a of the left portion of the heatsink 204. This difference makes the gravity center of the heatsink located on its right position. The gravity's center generates torque when the clip is used to fasten the die onto the socket, and the torque is usually a reason why thermal pad 202 cannot closely contact with the die. Without close contact, heat conduction from the die to the thermal pad 202 cannot be performed effectively.

Please replace the paragraph beginning at page 7, line 1 with the following entry:

However, it should be noted that the stabilization plate 308 cannot be too thick, since a thick stabilization plate may make the thermal pad and the die separate. A thick stabilization plate 408, a heatsink 304 and a die are schematically shown in FIG. 4. In contrast, FIG. 5 schematically shows a stabilization plate 508 having a thickness approximately equal to that of the die 300. In FIG. 5, it seems that a satisfied fastening result occurs. However, this is provided that the fastening force ~~310~~ from the clip can be ignored. If the fastening force ~~310~~ is considered, the stabilization plate 508 is still too thick. Note that the achievement wanted is to have stable contact of the thermal pad onto the die 300. The fastening force ~~310~~ from the clip should be considered and this consideration tells us that the most preferable thickness of the stabilization plate 508 is slightly smaller than that of the die 300. Nevertheless, the thickness of the

stabilization plate 508 cannot be too small, since it would make the plate 508 has no contact with the chip under the die 300.

APPENDIX B – VERSION WITH MARKINGS TO SHOW CHANGES (CLAIMS)

VERSION WITH MARKINGS TO SHOW CHANGES (CLAIMS)

1. (Amended) A heatsink assembly, comprising:

a heatsink;

~~a thermal pad located under the heatsink;~~

a stabilization plate~~PORON slice~~, being located on a bottom of the heatsink and surrounding ~~the~~ a thermal pad located under the heatsink, for making the thermal pad closely compact to a die of a chip when the heatsink is located on the chip, wherein a thickness of the stabilization plate is smaller than a thickness of the die; and

an amount of paste, coated on the ~~PORON slice~~ stabilization plate, for sticking the ~~PORON slice~~ stabilization plate on the bottom of the heatsink.

2. (Amended) The heatsink stabilization plate of claim 1, wherein the ~~PORON slice~~ stabilization plate is an n-shaped slice in a top view.

~~3. The heatsink stabilization plate of claim 1, where in the PORON slice has a thickness smaller than that of the die.~~

4. (Amended) The heatsink stabilization plate of claim 1, wherein the ~~PORON slice~~ stabilization plate has a fingerprint thereon after being pressed by a finger, but the fingerprint disappears right away.

5. (Amended) A cooling assembly, comprising:

an stabilization plate~~of n-shaped PORON slice~~; and

a heatsink, stuck with the ~~n-shaped PORON slice~~ stabilization plate, wherein the heatsink comprises a right portion and a left portion respectively having a first plurality of cooling fins and a second plurality of cooling fins and the second cooling fins are less than the first cooling fins.

~~6. The cooling assembly of claim 5, wherein the heatsink comprises a right portion and a left portion respectively having a first plurality of cooling fins and a second plurality of cooling fins.~~

~~7. The cooling assembly of claim 6, wherein the second cooling fins are less than the first cooling fins.~~

8. (Amended) The cooling assembly of claim 5, further comprising a thermal pad located under the heatsink through which heat from a socket is conducted to the heatsink

9. (Amended) The cooling assembly of claim 8, wherein the stabilization plate~~n-shaped PORON slice~~ surrounds the thermal pad for making the thermal pad closely compact to the die when the heatsink is located on the die.

10. (Amended) The cooling assembly of claim 5, wherein the stabilization plate~~n-shaped PORON slice~~ has a thickness smaller than that of the die.

11. (Amended) The cooling assembly of claim 5, wherein the stabilization plate~~n-shaped PORON slice~~ has a fingerprint thereon after being pressed by a finger, but the fingerprint disappears right away.

12. (Amended) The cooling assembly of claim 5, wherein the stabilization plate~~n-shaped PORON slice~~ comprises two bars respectively having length of about 49.29 to about 49.31 millimeters in a top view.

13. (Amended) The cooling assembly of claim 5, wherein the bars respectively have width of about 9.99 to about 10.01 millimeters in a top view.

14. (Amended) The cooling assembly of claim 5, wherein the stabilization plate~~n-shaped PORON slice~~ comprises a lateral bar having a length of about 48.69 millimeters to about 48.71 millimeters in a top view.

15. (New) The heatsink assembly of claim 1, wherein the stabilization plate is made from an n-shaped slice.

16. (New) The cooling assembly of claim 5, wherein the stabilization plate is made from an n-shaped slice.

17. (New) A cooling assembly for conducting the heat from a die of a chip, comprising:

a heatsink;

a thermal pad, stuck to a bottom of the heatsink; and

a stabilization plate, stuck to the bottom of the heatsink,

wherein the stabilization plate is set around the thermal pad for making the thermal pad closely contact the die of the chip.